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Lucas, George Herbert William
Miscellaneous poisonings

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rison antinarcotic act. Levallorphan does not have this restriction. It is, therefore, more readily available in the event of an emergency.

When opiate overdosage is suspected, 5 mg. of nalorphine are given intravenously. As a rule, if depression is due to a narcotic, some change in the ventilatory pattern occurs. Usually there is an increase in rate and some increase in the over-all minute volume exchange within one minute. An additional 5 mg. of nalorphine or 1 mg. of levallorphan enhances this effect. The response, as a rule, is sustained for several hours. Should the patient relapse after this time, 5 or 10 mg. of nalorphine or 1 or 2 mg. of levallorphan should be repeated. In this respect the behavior of these antinarcotics differs from that of the analeptics used in the treatment of overdosage of hynotics. The latter require repeated administration to maintain the arousal effects and the return of reflex activity. As a rule, if no response is evoked when a 10 mg. dose of nalorphine is administered, one should strongly suspect that the depression is due to some other cause besides a narcotic. An additional 5 mg. may be added, but should this fail to evoke a response this course of therapy should be abandoned. The failure to respond is presumptive evidence that the depression is not due to a narcotic or that it is complicated by some other factor. The use of excessive quantities of either levallorphan or nalorphine enhances the depression. Hypotension, if due to a narcotic, is usually reversed. Nausea and vomiting, excitement and other side actions characteristic of the narcotics are not reversed or antagonized by levallorphan or nalorphine. Seldom is it necessary to give subsequent injections. If they are necessary they should be given at intervals of not less than two to two and a half hours.

Occasionally, several drugs have been used in conjunction with the narcotics, as, for instance, a barbiturate in combination with a narcotic. Generally my experience has been that the antinarcotics elevates the rate of respiration only to a certain point, but not to that ordinarily considered normal. In this case one of the analeptics, such as megimide may be tried.

The doses for infants and children should be scaled down according to body weight. Generally 0.1 mg. of nalorphine per pound suffices. Apneic or depressed infants delivered from mothers who have received narcotics during labor should have the drug administered into the umbilical or other vein. Usually 0.2 mg. as the initial dose suffices. (Should levallorphan be used, .04 mg. fractions may be given.) A second 0.2 mg. may be given if the first is without effect. If a third 0.2 mg. fraction is ineffective, the apnea is due to some other cause and not to a narcotic. It cannot be emphasized too strongly that all apneic babies born of mothers who have received narcotics are not necessarily depressed from the narcotic. In pediatric practice, as in adult practice, it is preferable to administer the doses in small fractions until the desired effect is obtained rather than to estimate what the dose might be and administer it in a single injection. The response is usually apparent within a minute. Seldom are more than two or three minutes required for full establishment of respiratory stimulation. The results are nowhere near as dramatic when the drug is given intramuscularly. It is advisable to administer the drug intravenously at all times. It is not necessary to administer a sustaining dose after the initial intravenous injection has caused reversal. No other stimulant is necessary to augment that of the levallorphan.

OTHER THERAPEUTIC MEASURES

Other therapeutic measures which may be indicated are aspiration of the stomach contents, maintaining fluid balance, prevention of bladder distention from accumulation of urine by inserting an indwelling catheter, and prevention of infection of the tracheal bronchial pulmonary tree. Antibiotics may be necessary prophylactically to avoid pulmonary infection.

MISCELLANEOUS POISONINGS, ACUTE

METHOD OF GEORGE H. W. LUCAS, PH.D., *University of Toronto,* AND ROBERT J. IMRIE, M.D., *Hospital for Sick Children, Toronto, Ontario, Canada*

FOREWORD

The authors, who form part of the personnel of The Poison Information Centre, The Hospital for Sick Children, Toronto, wish to draw the attention of all doctors to similar centres which are established in many large cities

in the United States and Canada by our federal governments. All the available information on the toxic ingredients in thousands of medicines, insecticides, pesticides and other registered commercial products has been placed in a confidential manner by the government in these Poison Information Centres, and as new drugs and preparations are marketed, government information regarding the toxic ingredients is forwarded to the centres. Each doctor should list the telephone numbers of several of the nearest centres so that he may telephone quickly for up-to-date information on the identity of and treatment for a poison.

It has been conservatively estimated that over 500,000 different household trade name substances are currently on the market and that 1500 new products are placed on the market each month. Most of these products are harmless when used according to directions, but, from tranquilizers to pesticides, each can be harmful—if not fatal—when *not* used as directed. It behooves the practicing physician, therefore, to acquaint himself with the available literature on the methods of treatment.

Poisoning should always be suspected in any otherwise unexplained acute illness, and more particularly when acute gastroenteritis, convulsions or coma are the presenting symptoms. There are no specific pathognomonic signs or symptoms in acute poisoning; instead, we are often presented with a bizarre clinical history and inconclusive physical signs. With the poison control concept persistently in mind, plus a little detective work, the seemingly elusive diagnosis can be made. Early diagnosis leads to prompt specific and supportive measures that could be life-saving.

It is quite impossible for any one physician to know all the signs and symptoms of the possible acute poisonings, but he can, and should, be very familiar with basic principles in order that he might treat a suspected case even though he does not know the exact identity of the poison.

Identification of an individual poison is often slow, as signs and symptoms are often confusing, histories may be unreliable or not available and chemical tests usually require hours or days. The initial vomitus or gastric lavage fluid, urine and feces should be saved for analysis.

PREVENTION OF POISONING

It has been shown conclusively by various investigators throughout the United States that chemical poisoning is preventable if ordinary safety precautions are employed in the handling, use and storage of drugs and toxic household preparations. Much has been said about the proper labelling of toxic substances by their manufacturers. This might help. The family physician, however, is the most important member of the team fighting accidental chemical poisoning. He alone knows the background, the customs, the traditions and the attitudes of his patients; he visits them frequently in their own homes and can see at a glance any potential hazards. This is a golden opportunity for him to educate the parents to be accident- and safety-conscious. He can make concrete suggestions regarding storage and handling of all potentially toxic substances: i.e., keep all drugs, poisonous substances and household chemicals in a locked cupboard, out of the reach of children; never transfer poisonous products from their original containers to pop bottles, coffee tins or drinking glasses. If flavoured or brightly coloured medications have been prescribed for children, always refer to them as *medicine*, and never as candy.

It is a dangerous habit to prescribe more medication than is necessary to meet the immediate need. Always caution adult members of the family to keep medicaments out of the reach of children—*not* on the television set, in the refrigerator, in the night table drawer or in grandmother's purse.

GENERAL PRINCIPLES OF TREATMENT

In response to a telephone call regarding a possible poisoning case, the physician must be cool, calm and collected. It is wise to give a minimum of instructions over the 'phone in order not to further confuse an already harassed patient or parent of a child.

Ingested poisons are by far the most common in accidental poisonings. If the victim has not consumed a strong acid, alkali or other corrosive, give instructions for him to drink three to four glasses of milk, which is an excellent nonoily demulcent, or a similar quantity of water, and following this, to insert the index finger deep in his mouth to make him vomit. Time is often precious; therefore instruct the patient to take only five minutes to produce emesis. If this fails, the patient should be taken immediately to hospital, clinic or office where a more accurate appraisal of the poisoning may be made and definitive treatment carried out.

When the patient arrives, a quick history and physical examination should be done. If the

physical signs of overdosage are present, they should be treated immediately.

Most patients should have a gastric lavage to remove any of the unabsorbed poison—except, of course, unconscious patients or those who have swallowed an acid, alkali or other corrosive. Gastric lavage is a simple, safe procedure if performed correctly. In the case of a child, he should be adequately restrained by being rolled tightly in a cotton sheet. The head should always be lower than the stomach; therefore elevate the foot of the bed. Never use a nasal tube, but a gastric tube with the largest lumen that can be passed orally. Gastric contents will easily plug a small-bore tube. To remove the contents from the stomach, use a large-bore metal ear syringe—larger than the conventionally used 50 cc. glass syringe. Never instill fluid into the tube until you are sure that the tube is in the stomach and not in the main bronchus. Always aspirate a small quantity of the thick, whitish, mucinous gastric juice before proceeding with the washings. If there is a specific antidote, leave it in the stomach before removing the lavage tube. If the nature of the poison is unknown, the patient should remain under close observation for twenty-four hours for the development of any latent signs or symptoms; any of the unused poison should be sent to a centre so that identification of the material can be instituted.

SUPPORTIVE MEASURES

If the patient has been severely poisoned, the maintenance of an airway is paramount. Use extreme caution in administering sedatives to a toxic patient. Remember that the simplest measures are the most effective. It is much easier to overtreat a patient with unnecessary antibiotics, sedatives and stimulants than it is to use scientific, skilfull neglect.

Oxygen Therapy. In cases of respiratory depression, unconsciousness, cyanosis or shock, oxygen therapy is of extreme importance. It may be administered by means of an intranasal catheter, a tight-fitting B.L.B. face mask or one of the newer complete, compact and highly efficient oxygen tents. As a rule, every emergency unit has oxygen available and this is most effectively administered with a tight-fitting B.L.B. facial mask. In cases where artificial respiration is necessary an inhalator is most effective. Rarely are these found in emergency units, but the fire or police departments usually have one or know where one can be located. It is preferable *not* to administer CO_2 with O_2 in the poisons dealt with in this article except in the case of carbon monoxide.

Fluid Treatment. In the past few years we have learned a good deal regarding electrolyte replacement therapy. It is unwise to administer intravenous fluids indiscriminately without the aid of blood chemistries. It is better to use oral or tube feedings than to give intravenous fluids without adequate laboratory facilities in cases of acute poisoning. A very good general intravenous solution to use awaiting chemical laboratory reports on the patient's serum is a ⅔ 5% glucose in water and ⅓ normal saline. Allow this solution to run intravenously at approximately 75 cc. per hour. In acute salicylism poisons, we are unable to tell clinically whether the patient is in a state of metabolic acidosis or respiratory alkalosis without the CO_2 of the serum and the pH of the blood. On more than one occasion sodium lactate has been administered intravenously when the patient was already in a state of respiratory alkalosis, with severe tetany as a result.

Shock. The most efficacious treatment of shock regardless of the cause is whole blood. It is not uncommon to have a poisoned patient in severe shock. One must bear in mind the importance of adequate circulating blood volume—and to increase it when necessary. Keep the patient in a shock position, that is, the head low and the feet slightly elevated. These patients should be handled as little as possible and should be kept warm with hot water bottles or warmed blankets.

Convulsions. As many poisonous materials are central nervous system excitants, the hazard of convulsions is ever present. If intravenous pentobarbital fails to stop convulsions due to strychnine picrotoxin, nicotine or cocaine immediately, then one must consider gas or ether anesthetic.

Antibiotics. Intramuscular aqueous penicillin still remains the antibiotic of choice in unknown or prophylactic cases. It is wise to give this drug following the inhalation of any of the aromatic or halogenated hydrocarbons or other volatile irritants as a prophylaxis against pneumonitis, mediastinitis or tracheitis. When the blood cultures, nose and throat cultures reveal the causative agent, then appropriate specific antibiotic therapy should be instituted.

Medicinal Charcoal (Activated Charcoal). This is a specially prepared charcoal in extremely small particle size intended to absorb certain organic and inorganic materials from aqueous solution. (The presence of water does not im-

pair the absorbing power.) It must not be confused with animal charcoal or charcoal of other forms—wood charcoal, burnt toast, etc., which are useless in the treatment of poisons. When administering it, 5 to 6 heaping teaspoonfuls should be stirred in a glass of water to make a very thin paste. Shortly after it has been swallowed remove it with an emetic or gastric lavage. Some fresh material may be left in the stomach to pass into the intestine.

Universal Antidote. Universal antidote consists of 1 part of magnesium oxide, 1 part of tannic acid and 2 parts of activated charcoal. The magnesium oxide neutralizes acids without formation of gas; tannic acid reacts with many substances to form insoluble salts (alkaloids, metals); medicinal charcoal adsorbs dyes, toxins, alkaloids and some salts of metals. The recommended dose is 15 grams (5 to 6 heaping teaspoonfuls) well stirred in a glass of water to form a thin paste before being swallowed. Following its administration it should be removed by an emetic or by gastric lavage; it is not advisable to leave the universal antidote in the stomach to pass into the intestines where the toxic substance might be slowly absorbed, but some fresh material may be left in the stomach to pass into the intestines.

Methylene Blue. Methylene blue is employed to reduce the amount of methemoglobin in the blood stream when large quantities of it have been formed by a poison. When the reduction of methemoglobin is not urgent the drug may be given orally in doses 60 to 300 mg. When rapid reduction is essential a 1% solution (10 mg. per ml.) may be injected intravenously slowly, 10 to 15 mg. per 22 lb. body weight. It is important to recognize that when methylene blue is injected rapidly into the bloodstream it oxidizes hemoglobin to methemoglobin. Advantage of this fact is taken in the treatment of cyanide poisoning where methemoglobin reacts with cyanide to form cyanmethemoglobin, a relatively nontoxic product. The doctor should appreciate that this reaction of methylene blue with hemoglobin and with methemoglobin is one in which equilibrium is established and the relative amounts of methemoglobin at any time will depend on the state of equilibrium.

Demulcent Drinks and Milk. Milk, while not a universal antidote, has an important place in the treatment of certain types of poisoning. Where there has been corrosion in the throat, oesophagus and stomach, it is the liquid of choice to swallow easily. If ingested poison reacts with protein, milk provides protein on which it will act, resulting in less injury to the tissues. After the reaction has taken place the stomach content may be removed with gastric lavage or an emetic. More milk may then be swallowed. Demulcents or mucilaginous materials may be prepared from linseed meal, oatmeal (gruel), barley, or egg white beaten with water. These are administered as soothing drinks where highly irritant or corrosive poisons have damaged the oesophagus or stomach.

Ascorbic Acid. Ascorbic acid in large quantities is employed for its detoxifying action on lead, arsenic and some bacterial toxins. It is useful also in decreasing cyanosis due to increased methemoglobin. Doses up to 10 grams have had no observable toxic effect. It is available in tablets and in ampules containing sodium ascorbate for injection.

British Anti-Lewisite (B.A.L., Dimercaprol Injection). This drug has been used mainly to combat severe arsenic and mercury poisoning. For arsenic poisoning 30 mg. per 25 pounds of body weight may be given every four hours (six injections daily for two days); four injections are given on the third day and two on each of the following days until recovery. In mercury poisoning larger doses are indicated: 30 mg. per 15 pounds of body weight followed in one or two hours by 30 mg. per 20 pounds of body weight. Two more such doses may be given within the twelve-hour period after the first injection if poisoning is severe. On the second day two such doses may be given and on the third day one dose; one dose daily may be continued until recovery. The treatment with B.A.L. should begin as soon as possible after the poisoning has occurred.

Calcium Disodium Versenate. This is the calcium chelate of ethylene diamine tetra-acetic acid (EDTA). It is employed in the deleading of bone following lead poisoning and should be employed *only* in a hospital.

Purgatives. Saline purgatives consist of magnesium sulfate (Epsom salt), sodium sulfate (Glauber's salt) and Rochelle salts (sodium potassium tartrate). Since under some circumstances magnesium may be absorbed from the intestine and produce some central depression, sodium sulfate may be considered a more suitable purgative. In numerous poisonings large doses of mineral oil (liquid paraffin, liquid petrolatum) are administered. Liquid paraffin is not considered as an oil cathartic. It has the advantage that, although it may not cause purgation rapidly, it may absorb certain toxic

materials and thus remove them from the gastrointestinal tract.

Emetics. In adults and older children emetics may be used to advantage to remove relatively large particles such as undissolved tablets, capsules, pills and pieces of food from the stomach; these might not pass through a stomach tube. Recommended emetics are solutions made by stirring 1 to 3 teaspoonfuls of mustard powder in a glass of lukewarm water or a teaspoonful of salt in 3 oz. of warm water. Soap suds may be administered also. Emetics should not be administered when the vomiting centre has been depressed by narcotic substances or when a corrosive acid or alkali has been ingested. During the expulsion of vomitus, especially when vomiting occurs after the ingestion of volatile substances such as kerosene or gasoline, the head of the patient should be lower than the hips. The vomiting reflex can be more readily elicited when the stomach is full. When vomiting does not occur spontaneously after the ingestion of an emetic, tickling the throat with a finger or tongue depressor may be sufficient to bring it about.

Acid Burns. Acid burns, particularly in the eye, should be treated immediately by placing the injured person on the floor and pouring gently on the eyeball several quarts of lukewarm water. When all the corrosive material has been washed away, some soothing antiseptic such as boric acid solution or drops of castor oil may be applied.

COMMON POISONS

1. ACONITE. (Monkshood, Wolfsbane, Blue Rocket)

Give universal antidote or activated charcoal and remove by emetic or gastric lavage using about 300 ml. 1:1000 potassium permanganate solution (a 0.3 gram [5 grains] tablet dissolved in 10 fl. oz. of water). Keep the patient warm and in bed, massaging the extremities and placing a mustard plaster over the heart. The pulse may be accelerated by injecting 1 mg. (1/60 grain) of atropine sulfate. Oxygen therapy (p. 657) may be required. Give hot drinks of tea or coffee or inject subcutaneously or intravenously 0.5 gram (7½ grains) of caffeine and sodium benzoate. Relieve cardiac depression by injecting intravenously 0.3 mg. (1/200 grain) of strophanthin.

2. ALCOHOL, ETHYL (Ethanol, Grain Alcohol) Acetone, Methyl Ethyl Ketone

Mild cases need no special care; in severe cases keep the patient warm and in bed. Do not give emetics. Remove the alcohol from the stomach by gastric lavage. Oxygen therapy (p. 657) may be necessary. Inject caffeine and sodium benzoate 0.5 gram (7½ grains) intramuscularly. Control acidosis as indicated for methyl alcohol. Strong respiratory stimulants are contraindicated.

3. ALCOHOL, ISOPROPYL

Treat as for Ethyl Alcohol.

4. ALCOHOL, METHYL (Wood Alcohol, Methyl Hydrate, Methanol, Wood Naphtha, Wood Spirit, Green Wood Spirit, Standard Wood Spirit, Manhattan Spirit, Pyroxylic Spirit, Colonial Spirit, Columbian Spirit, Eagle Spirit, Carbonol, Carbinol, Methyl Hydroxide, Lion d'Or, Canned Heat)

Keep the patient warm and in bed. Protect the eyes from light. Control severe acidosis quickly by injecting slowly intravenously 3 to 5 per cent sodium bicarbonate solution (about 1000 ml. per hour) or 160 ml. of sodium lactate solution in 1000 ml. physiologic saline. Depending on the severity of the poisoning, 150 grams or more of sodium bicarbonate may be necessary. Check the *p*H and the carbon dioxide combining power of the blood, or administer alkali until the urine is alkaline. Improvement in the patient's respiration is a good clinical guide. The patient must be watched closely as patients thus treated with alkali soon become acidotic again. If the patient's respiration is rapidly failing or he is in shock, oxygen should be administered at once. Nikethamide (3 ml. of a 25 per cent solution) may be given intravenously slowly.

5. ALKALI SULFIDES AND POLYSULFIDES

Treat as for caustic soda (6). Oxygen therapy may be necessary (p. 657). The source of the sulfide, i.e., such as barium, must be removed unless the damage to tissues is so extensive as to prevent it. If barium is present, administer sulfate in solution (20).

6. ALKALIS, CAUSTIC (Sodium Hydroxide [Caustic Soda, Lye, Gillett's Lye]; Potassium Hydroxide [Caustic Potash]; Sodium Carbonate [Washing Soda]; Potassium Carbonate; Soda Ash [Wood Ash, Lye]; Other Alkalis)

Do not attempt gastric lavage or give an emetic. External burns should be flooded with water and finally washed with 1 per cent boric acid solution. Give large drinks of water containing any one of vinegar, citric acid, lemon juice or juice of other citrus fruits. Give demulcent drinks or milk or teaspoonful doses of salad oil or olive oil. Pain may be relieved by injections of morphine as required. Watchful, careful nursing is essential. Administration of food may impose a problem. Special surgical

procedures for stricture of esophagus may be necessary. Cortisone, 5 mg. per pound of body weight per day administered in four divided doses, is recommended in severe cases to allay fibrosis.

7. ALUMINUM (Aluminum, Aluminum Sulfate, Ammonium Alum [Ammonium Aluminum Sulfate], Sodium Alum [Sodium Aluminum Sulfate], Potassium Alum [Potassium Aluminum Sulfate], Alum)

Give protein material such as egg white beaten in water, milk or cheese in finely ground state. This will be vomited as a rule, but if not, remove it with an emetic or gastric lavage (if corrosion is not too severe). Universal antidote is also useful. Keep the patient in bed and warm. Caffeine and sodium benzoate 0.5 gram (7½ grains) subcutaneously will serve as a stimulant. Administer fluid therapy (p. 657) for dehydration, to control renal tubular damage and central necrosis of the liver.

8. 3-AMINO-1,2,4,-TRIAZOLE (Actamer [Bithionol], Hexachloraphene)

These herbicides or germicides are relatively nontoxic, and treatment is symptomatic.

9. AMMONIA (Ammonium Hydroxide [Ammonium Hydrate, Ammonia Water, Hartshorn, Spirit of Hartshorn, Spirit of Ammonia, Spirit of Bones, Solution of Ammonia])

The fumes, which are highly irritating, may cause rapid loss of consciousness and death from shock. The patient should be removed to fresh air at once and oxygen therapy (p. 657) administered if respiration is difficult. Tracheotomy may be necessary if there is much edema of the glottis following inhalation or ingestion of the drug. If ingested, treat quickly as for caustic soda (6). The physician must use his own judgment in passing a stomach tube. The patient will require careful nursing. If the eyes are involved, place the patient on the floor and flush the cornea gently with quarts of water, finally washing with very weak vinegar solution or boric acid solution.

10. AMMONIUM, QUATERNARY, GERMICIDES AND RELATED PRODUCTS

Alkyl aryl sulfonate
Alrosept M.B.C.
Alrosept MM.
Aralkonium chloride
Benzalkomium chloride (Zephiran Chloride)
Benzethonium chloride (Phemerol Chloride)
Cetab
Cetyl pyridinium chloride (Cepryn Chloride)
Emulsept E670
Hyamine 1622
Hyamine 2389
Methyl benzethonium chloride (Diaparene Chloride)
Orolocide
Petronate

These substances are relatively harmless when ingested in small doses; large doses may cause some gastrointestinal distress which must be treated symptomatically.

11. AMPHETAMINE SULFATE (Benzedrine; Dexedrine [Dextro-Amphetamine Sulfate]; Methamphetamine hydrochloride [Desoxyephedrine Desoxyn, Norodin])

If poisoning is due to medication, stop this immediately. Oxygen therapy (p. 657) may be necessary. Administer barbiturates for sedation. If ingested in large quantities, empty the stomach with gastric lavage or an emetic and proceed as indicated above.

12. AMYL ACETATE (Banana Oil)

If inhaled, remove the patient to fresh air.
If ingested, empty the stomach with gastric lavage or by an emetic and continue treatment as for ethyl alcohol (2).

13. ANESTHETICS, LOCAL (Novocain [Procaine]; Pontocaine [Amethocaine, Tetracaine]; Nupercaine [Cinchocaine, Dibucaine, Percaine]; Lidocaine [Xylocaine]; Benzocaine [Ethylaminobenzoate]; Butacaine [Butyn]; Monocaine [Butethamine])

The treatment of acute poisoning by any member of the local anesthetic group is so similar that these poisons are considered under one heading; only a few have been listed. When it occurs following ingestion of the drug, administer quickly universal antidote or activated charcoal suspended in water and remove gastric content with an emetic or by gastric lavage using potassium permanganate 1:1000 (a 0.3 gram (5 grains) tablet dissolved in 300 ml. [10 fl. oz.] of water). Leave about 60 ml. (2 fl. oz.) of this solution in the stomach. Apply artificial respiration with oxygen when respiration fails, and restore circulation by injecting 0.5 to 1.0 ml. of 1:1000 epinephrine intravenously. Following restoration of circulation, small doses of nikethamide or Metrazol (pentylenetetrazol) may be administered to stimulate respiration. Death has occurred following small doses of local anesthetics; it is believed this is due to an idiosyncrasy to the drug.

14. ANILINE (AMINOBENZENE, AMIDOBENZENE) (Nitrobenzene [Oil of Mirbane, Essence of Mirbane]; Nitroglycerin [Trinitrin, Glonin]; Azobenzene [Azobenzide])

Administer universal antidote followed by an emetic or gastric lavage. Keep the patient warm and in bed. Give hot drinks of tea or coffee or 0.5 gram (7½ grains) of caffeine and sodium benzoate subcutaneously or intravenously. Relieve headache by keeping an ice bag or cold cloths on the head. Circulation may be maintained by injecting

intravenously 16 mg. or ephedrine hydrochloride or sulfate. Oxygen therapy (p. 657) may be required. For persistent cyanosis (due to methemoglobin) inject 6 to 12 ml. of 1 per cent methylene blue solution slowly intravenously or administer 60 to 300 mg. orally; 500 mg. of sodium ascorbate in 5 or 10 per cent solution may be given slowly intravenously followed by another 500 mg. in divided doses. Blood transfusion may be necessary.

15. ANTABUSE (Antabus, Disulfiram, Tetraethylthiuram Disulfide)

Oxygen therapy (p. 657) may be needed urgently. Improve circulation by administering 500 ml. of 5 per cent glucose; more may be necessary unless there is danger of pulmonary edema. Give an intravenous injection of 1 gram of sodium ascorbate. Keep the patient in bed and as quiet as possible. In very severe cases, a very slow intravenous injection of a 2 per cent solution of saccharated iron oxide (100 mg. in 5 ml.) has been beneficial; similar amounts may be given daily or on alternate days if the physician deems it advisable.

16. ANTIHISTAMINES

There are no specific antidotes.

Remove the drug from the stomach quickly with an emetic or gastric lavage. Control drowsiness by giving drinks of strong tea or coffee or by injections of caffeine and sodium benzoate 0.5 gram (7½ grains) intramuscularly or intravenously. Amphetamine sulfate or methamphetamine hydrochloride 20 mg. may be administered intravenously for the same purpose; these may be repeated as necessary. Employ sedatives for insomnia *with great caution.*

17. ANTU (Alpha naphthylthiourea)

No specific antidote and no human fatalities have been reported; treatment is symptomatic.

18. ARSENIC (Arsenious Acid, White Arsenic, Arsenious Anhydride, Ratsbane, Fowler's Solution). See *Antimony.*

19. ANTIMONY (Tartarated Antimony, Tartar Emetic, Antimony Trichloride [Butter of Antimony])

Treatment for these poisons is the same.

Administer quickly universal antidote and follow by an emetic or gastric lavage using large volumes of a 1 per cent sodium bicarbonate solution (3 level teaspoonfuls per quart of water). Keep the patient warm and in bed. Force fluids to combat dehydration (p. 657). Give mucilaginous drinks; morphine sulfate 15 mg. (¼ grain) may be used to control severe pain. Administer BAL quickly as directed (p. 658).

20. BARIUM (Carbonate, Chloride, Hydrate, Sulfide)

Give soluble sulfates in solution (Epsom salt, Glauber's salt, potassium alum, magnesium sulfate, sodium sulfate or milk of magnesia) to precipitate the barium. Follow with an emetic or gastric lavage with water. Oxygen therapy (p. 657) may be necessary if respiration is depressed. Give 15 mg. (¼ grain) of morphine sulfate to control severe pain; 0.1 to 0.3 gram (1½ to 4½ grains) of quinidine sulfate to prevent ventricular fibrillation and 0.5 to 1 mg. (1/120 to 1/64 grain) of nitroglycerine to reduce elevated blood pressure.

21. BELLADONNA ALKALOIDS (Atropine [Racemic Hyoscyamine], Deadly Nightshade, Henbane, Thorn Apple, Jimson Weed)

For ingestion, use universal antidote followed by emetic or gastric lavage with water or normal saline (2 level teaspoonfuls of salt per quart). Give sips of ice water to relieve dryness in the mouth and keep an ice cap on the head. Catheterization may be necessary. Physostigmine salicylate 3 mg. (1/20 grain) or pilocarpine nitrate 10 mg. (⅙ grain) may be employed to relieve peripheral symptoms or until the mouth is moist. Persistent excitation may be decreased by gas anesthesia or by cautious use of short-acting barbiturates. Give tepid baths; careful nursing is essential. Liquid petrolatum may be sprayed in the nose or placed in the conjunctival sac to relieve dryness. Eserine or pilocarpine drops may be employed to decrease dilatation of the pupil and relieve intraocular pressure. Protect the eyes from light. Combat respiratory failure by giving oxygen.

22. BENZENE (Benzol) (Toluene [Toluol], Xylene [Xylol])

Benzene is the most toxic of these when inhaled. All are equally toxic when ingested.

For inhalation, remove the patient to fresh air promptly; give oxygen; artificial respiration may be necessary.

For ingestion, swallow 1 per cent sodium bicarbonate solution (3 level teaspoonfuls per quart of water) and follow with an emetic or employ this solution in gastric lavage until the odor of the drug is removed. Keep the patient in bed. Blood transfusion may be necessary if there is much red cell destruction. Keep the patient on a high calorie diet; administer 15 mg. of folic acid intravenously or 5 to 10 ml. of liver extract intramuscularly as well as intramuscular penicillin.

23. BERYLLIUM

Keep the patient in bed and administer oxygen when cyanosis appears. Recovery usually is slow; months of treatment may be required. (See also Berylliosis, p. 651.)

24. BISMUTH (Bismuth Subnitrate, Bismuth Oxynitrate)

Administer an emetic or remove stomach contents by gastric lavage. Leave 3 to 4 heaping teaspoonfuls of magnesium sulfate or sodium sulfate dissolved in water in the stomach. Fluid therapy (p. 657) and BAL (p. 658) may be necessary. In case of cyanosis due to nitrite, see 14.

25. BITTER ALMOND OIL (Essential Oil of Bitter Almonds, Oil of Bitter Almonds)

See treatment for Cyanides (49).

26. BORIC ACID (Boracic Acid) (Borax [Sodium Borate, Sodium Biborate], Sodium Tetraborate, Sodium Perborate)

Keep the patient warm and in bed. Administer an emetic or perform gastric lavage if the drug has been ingested, using ample 1 per cent sodium bicarbonate solution (3 level teaspoonfuls dissolved in a quart of water). Caffeine and sodium benzoate 0.5 gram (7½ grains) may be given intramuscularly. Fluid therapy is important (p. 657).

27. BROMIDES (Sodium, Potassium, Ammonium, Lithium, Strontium or Calcium Bromide)

Withdraw bromide medication if such is in progress. If large doses have been swallowed, remove with gastric lavage using warm water. Increase sodium chloride intake and employ barbiturates or paraldehyde for sedation.

28. BROMINE

For ingestion, treat as for Iodine (77).

Following inhalation, remove the patient from the fumes; keep him quiet and warm—rest is most important. Oxygen therapy may be necessary (p. 657). Morphine in small doses may be injected to check spasmodic cough, but such medication must be used with discretion by the physician. Nebulized 5 per cent solution of sodium bicarbonate is said to alleviate the irritation of the respiratory tract.

29. CADMIUM

There is no specific treatment.

If vomiting has not removed ingested material, administer an emetic or perform gastric lavage. Control restlessness by use of barbiturates or paraldehyde (5 to 15 ml. injected). Morphine may be used if the respiration is not markedly depressed. Keep the patient in bed and warm; give food rich in protein and carbohydrates. Oxygen therapy (p. 657) and penicillin injection may be necessary if bronchopneumonia threatens.

30. CAFFEINE (Caffeine Citrate)

Control tremors or excitement by use of barbiturates given orally or by injection.

31. CAMPHOR (Gum Camphor, Laurel Camphor, Camphorated Oil, 2-Camphanone)

Administer an emetic or perform gastric lavage quickly. Convulsions may be controlled by gas inhalation or ether or by 100 to 300 mg. of pentobarbital intravenously; only short-acting barbiturates may be used. Intramuscularly injected paraldehyde 5 to 15 ml. is also valuable. Ephedrine sulfate 45 mg. (¾ grain) or caffeine and sodium benzoate 0.5 gram (7½ grains) may be given to support circulation. Keep the patient in bed. Avoid the use of opiates.

32. CANTHARIDES (Cantharis, Spanish Flies, Russian Flies, Blistering Beetle, Blistering Fluid, Tincture of Cantharides [Essence of Viper])

Give universal antidote or activated charcoal and follow with gastric lavage or an emetic. Give demulcent drinks and milk, but avoid fatty foods. Fluid therapy (p. 657) is advisable since renal impairment is likely. Keep the patient warm and in bed; an electric pad or hot water bottle may aid in controlling pain. Morphine sulfate 15 mg. (¼ grain) may be injected when pain becomes severe.

33. CARBON DIOXIDE (Carbonic Acid Gas, Carbonic Anhydride, Choke Damp, After Damp, Black Damp)

Remove the patient to fresh air and give oxygen therapy (p. 657); artificial respiration may be necessary. Drinks of tea or coffee or injection of caffeine and sodium benzoate 0.5 gram (7½ grains) subcutaneously may be used as stimulants. Recovery is slow; keep the patient in bed for several days.

34. CARBON DISULFIDE (Carbon Bisulfide)

Oxygen therapy (p. 657) may be required. Keep the patient warm and in bed in a well-ventilated room. Give drinks of tea or coffee or injections of caffeine and sodium benzoate 0.5 gram (7½ grains). Recovery is slow, and rest in bed for several days is advisable.

35. CARBON MONOXIDE

Remove the patient to fresh air immediately; apply artificial respiration if respiration has ceased. Administer oxygen containing 7 per cent carbon dioxide if possible. Nikethamide (5 to 10 ml. of a 25 per cent solution) may be given intravenously. Inhalations of amyl nitrite may be beneficial. Do not employ methylene blue. The patient needs good nursing and constant care until all danger of mental confusion or loss of memory is past.

36. CARBON TETRACHLORIDE AND RELATED CHLOR-PRODUCTS (Carbon Tetrachloride [Tetrachlormethane Chlorocarbon, Perchlor

Methane]; Ethyl Chloride [Chloroethyl, Kelene]; Trichloroethylene [Ethylene Trichloride]; Tetrachlorethylene)

These are considered together because they may cause poisoning by inhalation or following ingestion. Carbon tetrachloride is the most toxic.

If inhaled, remove the patient from the fumes and treat symptomatically, keeping him under supervision for delayed toxic symptoms from kidney or liver.

If ingested, swallow 4 fl. oz. of mineral oil and perform gastric lavage or empty the stomach by use of an emetic. Drinks of tea or coffee or subcutaneous or intravenous injections of caffeine and sodium benzoate 0.5 gram (7½ grains) may serve as stimulants. Administer 5 to 10 grams of calcium gluconate intramuscularly or intravenously. Give methionine or choline 2 grams by mouth every two hours if liver damage is evident. Feed a diet high in carbohydrate, excluding fat. Fluid therapy (p. 657) or blood transfusion may be necessary.

37. CHLORAL (Chloral Hydrate)

Perform gastric lavage immediately. Administer oxygen therapy (p. 657) for seriously depressed respiration. Nikethamide 1 to 4 ml. of a 25 per cent solution may be administered intramuscularly or intravenously and repeated as necessary. Fluid therapy may be employed to prevent shock and promote diuresis (p. 657).

38. CHLORINE

Remove the patient promptly to fresh air. Keep him warm and as quiet as possible. A nebulized 5 per cent solution of sodium bicarbonate helps in alleviating upper respiratory tract irritation. Oxygen therapy is usually necessary (p. 657), and intravenous injection of 50 per cent glucose may be valuable in relieving pulmonary edema. Administering oxygen bubbled through 50 per cent solution of ethyl alcohol in water lowers the surface tension of the edema fluid in the alveoli and allows the absorption of oxygen through this fluid. Administer for 10 minutes at a time and repeat treatment every 20 to 30 minutes as required. Nebulized epinephrine solution 1:100 or parenteral aminophylline is recommended to relieve respiratory distress.

39. CHLORINE ANTISEPTIC SOLUTIONS

Gastric lavage or an emetic; follow with demulcent drinks or milk. Sedation with Amytal (amobarbital) Sodium or other barbiturate if necessary.

40. CHLOROFORM

When inhaled, artificial respiration at once with oxygen. Inject caffeine and sodium benzoate 0.5 gram (7½ grains) or nikethamide 2 to 5 ml. (25 per cent solution) or Metrazol (pentylenetetrazol) 1 ml. 10 per cent solution intravenously. Strophanthin 0.5 mg. or other suitable glycoside may be given intravenously. Treat symptomatically for liver damage.

When ingested, treat as for carbon tetrachloride (36).

41. COLCHICUM (Meadow Saffron, Colchicum [Seed, Corm, Root], Colchicine)

Give universal antidote or activated charcoal and follow quickly by gastric lavage or an emetic. Oxygen therapy may be required depending on the depression of respiration (p. 657). Morphine sulfate 15 mg. (¼ grain) and atropine sulfate 0.6 mg. (1/100 grain) may be injected to relieve pain and spasm. (Morphine must be used *with caution.*) Keep the patient warm and in bed. Give demulcent drinks and milk.

42. COPPER (Copper Acetate [Verdigris]; Copper Sulfate [Blue Vitriol, Bluestone, Blue Copperas]; Copper [Chloride, Nitrate, Arsenite]; Schweinfurt Green, Scheele's Green, Brunswick Green; Bordeaux Mixture)

Administer potassium ferrocyanide 0.6 gram in water as quickly as possible or give soap suds or alkaline substances such as lime or weak sodium carbonate (washing soda) to precipitate the copper. Proteins such as white of egg beaten with water, barley water, gruel or cheese in fine pieces will also precipitate the metal. If the stomach content is not vomited, give an emetic or perform gastric lavage. Keep the patient in bed and warm —a heating pad may be necessary. Drinks of tea or coffee may be given after removal of the stomach content, or caffeine and sodium benzoate 0.5 gram (7½ grains) may be injected subcutaneously or intramuscularly. Morphine sulfate 15 mg. (¼ grain) hypodermically may be used to control pain. Fluid therapy (p. 657) may be necessary.

43. CORROSIVES (Mineral Acids and some Organic Acids—Sulfuric, Hydrochloric [Muriatic], Phosphoric, Trichloroacetic, Glacial Acetic)

Do not give emetics. Have the patient swallow quickly some alkali such as milk of magnesia, lime water or aluminum oxide gel. Avoid carbonates if possible in order to reduce gas formation in the stomach. Give milk, linseed tea or white of egg beaten with water. Morphine sulfate 15 mg. (¼ grain) may be given to control pain. Food administration may present a problem; therefore, glucose rectally or intravenously should be considered. Surgical treatment may be necessary. Cortisone, 5 mg. per pound of body weight per day administered in four divided doses, may be used in severe cases to allay fibrosis.

44. COTTON ROOT BARK

Give universal antidote or activated charcoal and follow with gastric lavage using 1:1000 potassium permanganate solution (a 0.3 gram (5 grains) tablet dissolved in 30 ml. [10 fl. oz.] of water), or an emetic. Keep the patient warm and in bed. Oxygen therapy (p. 657) may be necessary. Give drinks of strong tea or coffee or injections of caffeine and sodium benzoate 0.5 gram (7½ grains) as stimulants.

45. CRAYONS (Chalk Crayons, Wax Crayons)

Chalk crayons are likely to contain lead, copper, arsenic or chromium pigments. Wax crayons are likely to contain toxic dyes.

Give universal antidote or activated charcoal and follow by gastric lavage using water, normal saline or 2 per cent sodium bicarbonate solution (3 heaping teaspoonfuls per quart) or by an emetic. Methemoglobinemia or mild symptoms of aniline poisoning require treatment as outlined for aniline (14).

46. CROTON OIL (Oleum Tiglii, Karathane)

Give white of egg beaten with water or flour mixed with water; follow by gastric lavage or an emetic. Fluid therapy may be necessary to control shock or dehydration (p. 657). Injections of morphine sulfate 15 mg. (¼ grain) with atropine sulfate 0.6 mg. (1/100 grain) will relieve pain and spasm. Drinks of tea or coffee or aromatic spirit of ammonia 4 ml. (a teaspoonful) in a wineglassful of water are recommended.

47. CUTICLE REMOVER (Cutex)

Give an emetic or perform gastric lavage. Follow with a glass of milk or white of egg beaten with water or a spoonful of olive oil. The material may be caustic; if so, follow treatment as described for caustic alkali (6).

48. CYANAMIDE (Calcium Cyanamide)

Spontaneous recovery occurs in a few hours if the drug has been *inhaled.*

Following ingestion, empty the stomach by gastric lavage or by an emetic. Do *not* administer caffeine, theobromine, chloral hydrate or alcohol as medication.

49. CYANIDES (Hydrocyanic Acid [Hydrogen Cyanide, Prussic Acid, Acid Borussicum]; Sodium and Potassium Cyanide; Cyanogen Chloride; Acrylonitrile [Vinyl Cyanide])

Treatment must be rapid to be of any value at all.

If swallowed, drink quickly a glass of sodium thiosulfate solution (a level teaspoonful in 3 fl. oz of water). Remove with an emetic or by gastric lavage. Give amyl nitrite by inhalation, using artificial respiration if necessary. Oxygen therapy (p. 657) may be required. Administer *slowly* intravenously (2.5 to 5 ml. per minute) 10 ml. of 3 per cent (30 mg. per ml.) sodium nitrite solution as soon as possible and follow by injecting intravenously 50 ml. of a 25 per cent solution of sodium thiosulfate. Repeat these injections using half quantities if symptoms reappear. As an alternative to the nitrite solution administer intravenously 50 ml. of a solution of 1 per cent methylene blue in 1.8 per cent sodium sulfate.

50. 2,4-D (2-4 Dichlorophenoxyacetic acid)

This weed-killer is not very toxic to animals or man. If quantities of it are swallowed they should be removed with an emetic or gastric lavage as described for Petroleum Distillates (98).

51. DEPILATORY PREPARATIONS

Treatment as for barium (20) or for hair waving lotions (thioglycollic acid [66]).

52. DICHLOROBENZENE (Paradichlorobenzene, Dichloricide, P.D.B.)

This insecticide is the least toxic of moth repellants. Keep the patient warm and in bed; remove gastric contents with an emetic or gastric lavage, after which give drinks of tea or coffee or give caffeine and sodium benzoate 0.5 gram (7½ grains) intramuscularly. Administer a saline purge. Avoid oil cathartics or fatty foods. Give demulcent drinks. Fluid therapy (p. 657) may be necessary. The diet should be high in carbohydrate, vitamins and protein.

53. DIETHYLENE GLYCOL (Diethylene Ether)

Empty the stomach with gastric lavage or with an emetic immediately. Fluid therapy (p. 657) is essential. Remove the patient to a hospital because delayed and severe kidney damage may result. This poison should not be confused with ethylene glycol (antifreeze).

54. DIGITALIS AND RELATED GLYCOSIDES (Digitoxin, Digoxin, Lanatoside C, Ouabain, Strophanthin)

Administer 5 to 6 heaping teaspoonfuls of universal antidote or activated charcoal and remove the stomach content with an emetic or gastric lavage. Keep the patient in bed and as quiet as possible. Administer morphine sulfate 10 to 15 mg. (⅛ to ¼ grain) to control pain of vomiting and diarrhea. Although no specific antidote has been suggested for this type of poisoning, it is recommended that the loss of serum potassium which occurs be replaced by giving Darrow's solution intravenously at a rate not in excess of 0.5 mEq. per kg. per hour.

55. DINITROPHENOL

Mild cases require no treatment. In severe cases perform gastric lavage with 5 per cent sodium bicarbonate solution (about 3 level teaspoonfuls in 8 fl. oz. of water) or with 1:1000 potassium permanganate (a 5 grain tablet dissolved in 10 fl. oz. of water). Fluid therapy (p. 657) may be necessary and so may oxygen therapy (p. 657). The patient should be hospitalized as soon as possible.

56. ECBOLIC AND VOLATILE OILS (Pennyroyal, Savin, Rue, Tansy, Nutmeg, Apiol, Eucalyptus, Menthol)

Treatment as for turpentine (127).

57. EPINEPHRINE (Adrenalin)

Intravenous injections of piperoxan (benzodioxan, Benodaine) 10 to 20 mg. have been recommended recently since it has fewer side effects and appears effective. Administer supportive therapy.

58. ERGOT (Ergotoxine, Ergotamine Tartrate, Ergometrine Maleate, Liquid Extract of Ergot)

Give universal antidote or activated charcoal and follow with gastric lavage or with an emetic. Leave some activated charcoal and 3 to 4 heaping teaspoonfuls of Epsom salt in the stomach. Keep the patient in bed and warm; an electric pad or hot water bottles may be necessary. Oxygen therapy (p. 657) may be required. Stimulants such as tea or coffee or injections of caffeine and sodium benzoate 0.5 gram (7½ grains) are useful. Morphine sulfate 15 mg. (¼ grain) may be injected to control pain and quiet a patient in threatened abortion. Watch for evidence of gangrene in the extremities.

59. ETHYLENE GLYCOL (Antifreeze)

Treat as for oxalic acid (93).

60. ETHYLENE OXIDE

Blisters which appear several hours after exposure to this fumigant should be treated with sterile petrolatum pressure dressings.

If the material is *ingested,* remove gastric content with gastric lavage and administer supportive measures.

61. FERN, MALE (Felix Mas, Male Fern, Aspidium Oleoresin, Oleoresin of Male Fern, Extract of Male Fern)

Administer an emetic or remove stomach content with gastric lavage. Control convulsions by use of phenobarbital or Amytal (amobarbital) Sodium. Oxygen therapy (p. 657) may be necessary. Give demulcent drinks but do not administer fats, oils or alcohol. Caffeine and sodium benzoate 0.5 gram (7½ grains) intravenously or 1 to 4 ml. nikethamide 25 per cent solution or amphetamine sulfate 5 to 10 mg. may be used to combat collapse.

62. FINGER NAIL POLISH

The toxic ingredients are not known.

Give universal antidote or activated charcoal and follow with gastric lavage or an emetic. Give drinks of milk, white of egg beaten with water or a spoonful of olive oil. Do *not* give castor oil. Keep the patient quiet and under careful observation for some hours for symptoms from absorbed drugs.

63. FLUORIDES (Sodium Fluoride, Potassium Fluoride, Fluosilicates, Sodium Fluoroacetate, Sodium Fluoaluminate, DFDT)

Swallow quickly a solution of some soluble calcium salt—lime water, calcium gluconate or calcium lactate. Remove gastric content by means of an emetic or with gastric lavage. Keep the patient in bed, warm and as quiet as possible. Morphine sulfate 15 mg. (¼ grain) may be used to control pain if respiration is not too seriously depressed. Oxygen therapy (p. 657) may be required. Give demulcent drinks and olive or salad oil. Restore the blood calcium by injections of 10 ml. of a 10 per cent calcium gluconate solution intravenously. Barbiturates may be employed to control convulsions.

64. FOOD POISONING (Due to Fungi, Mushrooms, Toadstools, False Morels, etc.)

Since these poisons may resemble muscarine in action, atropine sulfate 0.6 mg. (1/100 grain) may be injected and repeated in an hour as a parasympathetic depressant. Give universal antidote or activated charcoal and remove with an emetic or gastric lavage using 1:1000 potassium permanganate solution (a 5 grain tablet dissolved in 10 fl. oz. of water) if vomiting has not begun. Keep the patient warm and in bed. Hypodermic injections of morphine sulfate or meperidine (Pethidine, Demerol) with or without atropine may be given to relieve pain. Fluid therapy (p. 657) may be necessary when there is marked dehydration. Restrict the diet to fruit juices, soups, tea and sugar for twenty-four hours. Avoid meats. In cases of persistent excitement, give barbiturates. A saline cathartic may be given to clear the intestine of poisonous material.

65. FORMALDEHYDE (Formalin, Trioxymethylene, Paraformaldehyde)

Swallow quickly well diluted ammonia or solution of ammonium acetate or aromatic spirit of ammonia or milk or white of egg beaten with water. Remove the gastric content with an emetic or gastric lavage with a diluted ammoniacal solution (see above). Give demulcent drinks and control acidosis by intravenous sodium bicarbonate solution or sodium r-lactate solution.

66. HAIR WAVING PREPARATIONS (Cold Wave, Thioglycollic Acid, Perborates and Bromates of Sodium and Potassium)

If the solution ingested is strongly alkaline due to thioglycollic acid, treat for caustics (6). Perborates will give rise to boric acid poisoning (26). Bromates are as toxic as chlorates (109) and have greater central depression. A marked dermatitis may accompany the poisoning.

67. HEADACHE REMEDIES AND OTHER ANALGESICS (I) (Acetanelid [Antifebrin]; Acetophenetidin [Phenacetin]; Aminopyrine [Amidopyrine, Pyramidon]; Phenazone [Antipyrine])

Administer universal antidote or activated charcoal and follow with an emetic or gastric lavage. Keep the patient warm and in bed. Control depressed respiration with oxygen therapy (p. 657) and cyanosis by 6 to 10 ml. of a 1 per cent solution of methylene blue intravenously. Strophanthin 0.3 mg. (1/200 grain) intravenously may be given at half-hour intervals for a failing myocardium. Blood transfusion may be necessary.

68. HEADACHE REMEDIES AND OTHER ANALGESICS (II) (Acetyl Salicylic Acid [Aspirin], Methyl Salicylate, Sodium Salicylate, Oil of Wintergreen, Salicylic Acid, Salol, Salicylamide)

Administer universal antidote or activated charcoal and follow with an emetic or gastric lavage. Determine first whether the patient is suffering from metabolic acidosis or respiratory alkalosis by determining the blood *p*H and the CO_2 combining power. Acidosis may be controlled by the intravenous use of 2.5 per cent solution of sodium bicarbonate. In a severe case 50 ml. of this solution should be given stat. Further bicarbonate should be given only after the *p*H has been rechecked. If the *p*H reveals alkalosis the patient may be made to rebreathe his own CO_2 or he may be given 5 per cent CO_2 inhalation. If the alkalosis is severe and the patient develops tetany, 10 per cent calcium gluconate should be given intravenously. Short-acting barbiturates may be given to control excitement. Epinephrine solution (1:1000) 0.5 ml. may be necessary to alleviate laryngeal spasm.

69. HEADACHE REMEDIES AND OTHER ANALGESICS (III) (Cinchophen [Quinophan, Atophan]; Neocinchophen [Novatophan, Tolysin, Neoquinophan])

Acute poisoning by these analgesics resembles that of salicylate (68). They may also cause hematuria and toxic hepatitis which may proceed to a fulminating yellow atrophy of the liver.

70. HEMLOCK, POISON

Universal antidote or activated charcoal should be given and followed with gastric lavage or an emetic. Keep the patient warm and in bed; an electric pad or hot water bottle may be needed. Give drinks of tea or coffee or injections of caffeine and sodium benzoate 0.5 gram (7½ grains) or of amphetamine.

71. HEMLOCK, WATER

Universal antidote or activated charcoal should be given and followed with gastric lavage or an emetic. Control convulsions by injections of pentobarbital or Amytal (amobarbital) Sodium. Intravenous calcium gluconate may be necessary if liver damage becomes apparent.

72. HYDROGEN SULFIDE

Death may be very sudden and is usually preceded by asphyxial collapse.

Remove the patient immediately from the poisonous atmosphere and give oxygen therapy (p. 657). Nikethamide 1 to 2 ml. of a 25 per cent solution or Metrazol (pentylenetetrazol) 100 to 400 mg. in a 10 per cent solution (1 to 4 ml.) may be injected intravenously. The nikethamide may be repeated in a few minutes if necessary. Caffeine and sodium benzoate 0.5 gram (7½ grains) injected intravenously is also recommended.

73. HYOSCINE (Scopolamine)

Treatment is mainly as for atropine (21), but if there is a general depression it may be relieved by the intravenous injection of 1 to 4 ml. of a 25 per cent solution of nikethamide or 1 to 3 ml. of a 10 per cent solution of Metrazol (pentylenetetrazol).

74. INDALONE (Rutgers 6-1-2; 2-Ethyl Hexanediol-1,3; Dimethyl Phthalate, Endothal)

If these insect repellants have been *ingested,* perform gastric lavage as quickly as possible or give an emetic. Keep the patient warm and in bed. Fluid therapy (p. 657) may be necessary for renal damage. Keep the diet high in protein and carbohydrate and low in fat.

75. INK AND INDELIBLE PENCIL

The dyes in these materials usually are not very toxic. Give universal antidote or activated charcoal and follow with an emetic or gastric lavage.

76. INSECT BITES (Ant Bites, Bee Stings, Spider Bites [Black Widow Spider], Wasp Stings)

These cases are rarely fatal, but a severe anaphylactic shock may require immediate energetic treatment. Make the patient lie down. Urticaria may be controlled by 0.5 ml. of 1:1000 epinephrine subcutaneously. Remove the stinger if it is present. Cover wounds with a paste of baking soda or ammonia or washing soda (any alkaline material made into a paste). Injections of ACTH have proved

beneficial in cases of wasp sting and of black widow spider bites. Sedatives may be administered to control excitement. (See also pp. 689, 691.)

77. IODINE (Tincture of Iodine)

Give plenty of water with starch or flour or, if possible, 4 level teaspoonfuls of sodium thiosulfate in water. Remove the gastric content with an emetic or gastric lavage. Give drinks of water or white of egg beaten with water. Inject morphine sulfate 15 mg. (¼ grain) to relieve pain if necessary.

78. IRON SULFATE (Ferrous Sulfate)

Administer quickly sodium bicarbonate solution (a level teaspoonful of baking soda in 3 fl. oz. of water). Induce vomiting or perform gastric lavage with more bicarbonate solution. Give 0.2 gram (3 grains) bismuth carbonate every four hours. Maintain fluid balance (p. 657). For shock see p. 657.

79. LEAD (Lead Acetate [Sugar of Lead], Lead Subacetate, Tetraethyl Lead)

Administer quickly some soluble sulfate in solution—Epsom salt, sodium sulfate or aluminum sulfate. Emesis usually occurs, but if it does not, remove the gastric contents by means of an emetic or gastric lavage. Keep the patient warm and in bed. Morphine sulfate 15 mg. (¼ grain) may be used to control pain. Oxygen therapy (p. 657) may be required. Removal of the lead from the tissues should be carried out later in a hospital by means of calcium EDTA. If tetraethyl lead is spilled on the skin it should be washed off immediately with kerosene or gasoline.

80. LETHANE 384 (Beta-butoxy-beta-thiocyanodiethylether, Thiocyano Diethyl Ether, Lethane 60)

Refer to Cyanides (49).

81. LINDANE (B.H.C., Benzene Hexachloride, Gammexane (the Gamma Isomer), Gamma Benzene Hexachloride)

When skin contamination occurs, clean the area well with soap and water; remove contaminated clothing and clean it thoroughly. Remove *ingested* material quickly by means of an emetic or gastric lavage using dilute Epsom salt solution. Leave about 3 to 4 heaping teaspoonfuls of Epsom salt or Glauber's salt in solution in the stomach. Do *not* use an oil cathartic or give injections of morphine. Administer oxygen before pulmonary complications develop. Drinks of tea or coffee or injections of caffeine and sodium benzoate 0.5 gram (7½ grains) subcutaneously or intramuscularly may be given. If tremors develop, administer either phenobarbital or Amytal (amobarbital) Sodium orally or by injection as required. Careful nursing may be necessary for at least forty-eight hours. The diet should be high in protein and low in fat. Give 2 grams of methionine or choline every two hours to combat liver damage. Blood transfusion may be necessary.

82. MEPERIDINE HYDROCHLORIDE (Pethidine Hydrochloride, Isonipecaine, Demerol, Dolantin, Dolantol)

If the drug has been *ingested,* give universal antidote or activated charcoal and follow with gastric lavage or an emetic. Tremors or convulsions may be controlled by N-allylnormorphine (Nalline) in 5 to 10 mg. doses repeated after 10 to 15 minutes or by injections of Amytal (amobarbital) Sodium.

83. MERCURY (Mercuric Oxycyanide, Mercuric Chloride, Mercuric Nitrate, Mercury Bichloride [Corrosive Sublimate], Mercuric Cyanide, Mercuric Oxide, Mercuric Potassium Iodide, Mercurous Chloride [Calomel], Mercurous Oxide, Ammoniated Mercury, Mercurial Diuretics [Mercurophylline], Mercurochrome, Merthiolate [Thimerosal], Metaphen, Merbromin)

Metallic mercury ingested in small quantity (as from a broken thermometer) is not toxic; it may be removed by a saline cathartic.

Administer quickly universal antidote or activated charcoal or albuminous foods—white of egg beaten with water, milk, gelatin, ground meat, etc. Remove this material from the stomach with an emetic or gastric lavage if it can be performed. Wash the stomach with a sodium bicarbonate solution made by dissolving a level teaspoonful of the salt in 6 fl. oz. of water. Calcium gluconate, 10 ml. of a 10 per cent solution, may be used intravenously or intramuscularly to control muscle spasm. Administer BAL (p. 658).

84. METALDEHYDE (Meta)

Give universal antidote or activated charcoal and empty the stomach with an emetic or gastric lavage. Leave 3 or 4 heaping teaspoonfuls of Epsom salt or sodium sulfate dissolved in water in the stomach. Keep the patient warm and in bed. Fluid therapy may be required (p. 657). Calcium gluconate, 10 ml. of a 10 per cent solution may be needed to arrest tetany. Amphetamine may be administered orally or parenterally if a stimulant is needed. In case of serious cardiac disturbance, injection of a digitalis glycoside is recommended.

85. METAL FUME FEVER (Brass Founder's Ague, Zinc Fever)

The fever, chills, etc., which occur several hours after exposure to the fumes are serious but nonfatal; the attack ends in twelve to twenty-four hours.

86. METHYL BROMIDE

Remove the patient from the fumes. Treat as for methyl chloride (87).

87. METHYL CHLORIDE

Remove the patient from the fumes and administer oxygen if respiration is depressed. Treat acidosis with 5 per cent sodium bicarbonate solution or sodium r-lactate solution as for methyl alcohol (4). Restlessness may be controlled by bromides or by Amytal (amobarbital) Sodium. Convalescence is slow.

88. NAPHTHALENE (Naphthaline, Naphthalene Camphor, Tar Camphor, Albocarbon, Moth Balls, Camphylene, Alabastine, Tetralene)

Keep the patient warm and in bed. Remove the gastric content by an emetic or by gastric lavage. Give drinks of tea or coffee or give caffeine and sodium benzoate 0.5 gram (7½ grains) intramuscularly as a stimulant. Administer a saline purge; avoid castor oil or fatty foods. Drinks made of egg white beaten with water or of milk may be helpful. Give fluid therapy (p. 657) as required. The physician should bear in mind that acute hemolytic anemia with a crisis may follow ingestion of even a small quantity of naphthalene, requiring a blood transfusion.

89. NICOTINE (Black Leaf 40, Tobacco)

Mild cases are not serious, and symptoms subside as a rule in a few hours.

In acute poisoning, swallow quickly universal antidote or activated charcoal suspended in water; tannic acid or strong tea may serve as a substitute. Remove the gastric content by gastric lavage using 1:1000 potassium permanganate solution (0.3 gram [5 grains] tablet dissolved in 300 ml. [10 fl. oz.] of water); leave about two ounces of the permanganate solution in the stomach. Failing gastric lavage, empty the stomach with an emetic. Keep the patient in bed and warm with an electric pad. Forty mg. of ephedrine sulfate may be used to maintain circulation. Oxygen therapy (p. 657) may be required. In mild poisoning excitement may be relieved by pentobarbital sodium 100 mg. or Amytal (amobarbital) Sodium 60 to 200 mg.

90. NIKETHAMIDE (Coramine)

If ingested, remove the stomach content with an emetic or gastric lavage. Oxygen therapy may be required (p. 657). Control tremors or convulsions by use of suitable doses of Amytal (amobarbital) Sodium or phenobarbital.

91. NITROCHLOROFORM

Remove the patient from the contaminated area and give oxygen therapy (p. 657) if respiration is difficult; artificial respiration may be necessary. Wash the contaminated areas of the skin with an alcoholic solution of sodium sulfate. Keep the patient in bed and warm and quiet. Respiratory stimulants are not contraindicated.

92. OPIUM AND BARBITURATES

Not discussed in this section. See pp. 651, 653.

93. OXALIC ACID AND OXALATES (Oxalic Acid [Essence of Sugar, Acid of Sugar]; Potassium Oxalate; Potassium Binoxalate [Salt of Sorrel]; Potassium Quadroxalate [Essential Salts of Lemon]; Sodium Oxalate; Rhubarb Leaves)

Promptly administer in water 5 to 6 heaping teaspoonfuls of calcium lactate or saccharated solution of lime or chalk or plaster to form insoluble calcium oxalate. Lacking these, give milk or cheese in large quantities or milk of magnesia or Epsom salt. Potassium permanganate 300 ml. (10 fl. oz.) 1:1000 solution (a 0.3 gram [5 grains] tablet dissolved in 300 ml. [10 fl. oz.] of water) may be swallowed or used as a gastric lavage. An emetic may be employed to remove the stomach content. Keep the patient in bed and warm. Give demulcent drinks or milk. Calcium gluconate by mouth is of value in restoring the blood calcium. Fluid therapy (p. 657) may be necessary to increase diuresis.

94. PARAPHENYLENEDIAMINE (ORSIN) AND RELATED PHENYLENE DIAMINES

If ingested, administer an emetic or empty the stomach with gastric lavage. Keep the patient in bed and as quiet as possible. Oxygen therapy (p. 657) may be necessary to relieve asthma, or it may be relieved by ephedrine, epinephrine or aminophylline. For tremors and convulsions give Amytal (amobarbital) Sodium or pentobarbital sodium.

95. PENTYLENETETRAZOL (Leptazol, Metrazol Cardiazol)

If ingested, administer universal antidote or activated charcoal and remove stomach content with an emetic or gastric lavage. Control convulsions by use of ether or other gaseous anesthetic or by use of barbiturates, chloral or paraldehyde.

96. PEST CONTROL POISONS (Insecticides, Pesticides, Herbicides) (I)

Calcium polysulfide
Chloro I.P.C. (isopropyl N-(3-chlorophenyl) carbamate)
C.M.U. (3-(p-chlorophenyl)-1-dimethylurea)
Crag Herbicide (sodium 2,4-dichlorophenoxyethylsulfate)
DDT
Dilan
Ethyl mercury chloride
Glyodin
Kuron
Maneb
Manzate
M.G.K. 264
Nabam
Ovotran
Penta
Perma
Permatox
Propham
Phygon
Sodium N-methyldithiocarbamate dihydrate
Sodium trichloroacetate (TCA)
Sulfenone
Sulfoxide
Thiram (Tetramethylthiuramdisulfide)

No specific treatment has been recommended for the poisons listed above. With these, danger may arise from contamination when the material is absorbed by the skin or is inhaled. If commercial preparations contain petroleum distillates, see 98. The solvent may increase the toxicity. When *skin contamination* occurs the areas should be washed thoroughly with soap and water. If marked irritation develops in the eyes, they should be flushed with water 10 to 15 minutes. When the drug has been *ingested,* remove it from the stomach with an emetic or with gastric lavage and follow by administering demulcent drinks. The doctor must use his own judgment in giving supportive therapy.

97. PEST CONTROL POISONS (Insecticides, Pesticides, Herbicides) (II)

Actidione
Allethrin
Ammate (ammonium sulfamate)
Butyl carbityl ether
Butyl carbityl-6-(propyl-piperonyl)
Captan
Castrix
Diazinon
Ferbam
Isobornyl thiocyanoacetate (Thanite)
Neotran (bis(p-chlorophenoxy)methane)
Piperonyl butoxide
Piperonylcyclonone
Pyrethrum (pyrethrum flowers)
Ricin
Rotenone (derris root)
Ryania
Sabadilla
Sodium selenate

For the above poisons, no specific treatment has been recommended. When they have been ingested, induce vomiting or remove gastric content by gastric lavage. Fluids such as milk or demulcents may be administered. Following the removal of the material, the doctor must use his own judgment in giving supportive therapy. Nembutal (pentobarbital) is recommended to control convulsions when they occur.

98. PETROLEUM DISTILLATES (Kerosene, Gasoline, Naphtha, Petroleum Spirits, Petroleum Ether, Petroleum Naphtha, Petroleum Benzine, Benzine, Petrol)

If the drug has been ingested, swallow quickly 4 fl. oz. (120 ml.) of liquid paraffin (mineral oil) and begin gastric lavage using sodium bicarbonate, 5 level teaspoonfuls in a quart of water. Gastric lavage is preferable to removal of the gastric contents by an emetic. In any event, the head must be lower than the hips as the gastric content is removed. Keep the patient in bed and warm. One to 4 ml. of nikethamide 25 per cent solution or caffeine and sodium benzoate 0.5 gram (7½ grains) may be used as a stimulant if necessary. Use intramuscular penicillin prophylactically. Pneumonia and kidney complications may occur later.

99. PHENOLPHTHALEIN AND PODOPHYLLIN

About an ounce of propylene glycol in an ounce of water is said to be a specific antidote. Administer universal antidote and remove gastric contents with an emetic or gastric lavage. There is usually mild to violent purging, but death does not occur. A rash accompanied by severe itching may appear.

Podophyllin, which also acts as a purgative, may be treated in a similar manner; fluid therapy (p. 657) may be necessary because of damage to the kidneys.

100. PHENOLS (Phenol [Carbolic Acid]; Cresol [Cresyl Hydrate Tricresol, Oxytoluene, Methyl Phenol, Cresylic Acid]; Resorcinol Metadihydroxybenzene]; Hexylresorcinol)

Medication must be *prompt.*

Swallow quickly about 7 fl. oz. (200 ml.) of 10 per cent alcohol or whisky diluted 1:3. If stronger alcoholic solutions can be swallowed, all the better, since alcohol is a solvent for phenol. Give any salt of calcium to form calcium phenolate, or administer Epsom salt, milk or white of egg beaten with water. Remove the gastric content with gastric lavage using a well lubricated tube. Continue lavage with warm water until all odor of phenols has disappeared. Administer caffeine and sodium benzoate 0.5 gram (7½ grains) subcutaneously or intravenously. Wash burns on the skin with rubbing alcohol. Oxygen therapy (p. 657) and fluid therapy (p. 657) may be necessary.

101. PHENOTHIAZINE

Wash contaminated areas with plenty of water. If the material has been *ingested,* induce vomiting or remove it by gastric lavage. Oxygen therapy (p. 657) may be required, and blood transfusion may be necessary if there are signs of blood destruction. The poisoning is rarely fatal.

102. PHOSGENE (Carbonyl Chloride)

Remove the patient from the contaminated atmosphere and keep him in bed, as quiet as possible and warm, using electric pads, etc., as necessary. Oxygen therapy (p. 657) may be required. Coughing may be controlled by codeine, Dilaudid (dihydromorphinone) or Metapon or some other cough depressant.

103. PHOSPHATES, ORGANIC

Bis(dimethylamino) phosphorus anhydride
Chlorothion
EPN (o-ethyl-o-(p-nitrophenyl)thionobenzene phosphonate)
HETP (hexa-ethyltetraphosphate)
Malathion
Metacide (di-methyl-p-nitrophenylthiophosphate)
Methyl parathion
Ompa (octamethylpyrophosphoramide)
Para-oxon
Parathion (di-ethylnitrophenylphosphate)
Schradan
Sulfotepp
Systox
TEPP (tetra-ethylpyrophosphate)
Tetraethyldithionopyrophosphate

The specific antidote for these poisons is atropine sulfate in large doses, 1 to 2 mg. (1/60 to 1/30 grain) administered quickly intravenously and repeated every hour. Doses up to 20 mg. (1/3 grain) may be given daily. Postural drainage may be necessary if secretions are excessive, and oxygen therapy should be available. Morphine injections are contraindicated.

104. PHOSPHORUS (Isopestox)

The best antidote for phosphorus is copper sulfate 0.3 gram (5 grains) in water swallowed quickly and followed with gastric lavage using sodium bicarbonate (12 level teaspoonfuls dissolved in a quart of water). Potassium permanganate 1 per cent solution may be used in gastric lavage together with 5 to 6 heaping teaspoonfuls of activated charcoal stirred to a thin paste. If these cannot be secured, swallow 4 fl. oz. (120 ml.) of liquid paraffin (mineral oil) and follow with gastric lavage. Treat for liver damage as indicated for carbon tetrachloride (36).

105. PICRIC ACID (Trinitrophenol, Trinitrophen)

Administer quickly some protein material—white of egg beaten with water, milk, finely ground cheese, etc. Remove this material from the stomach with an emetic or with gastric lavage. Fluid therapy (p. 657) may be necessary if there is much dehydration. Cathartics are not indicated.

106. PIPERAZINE CITRATE (Antepar)

Perform gastric lavage or give an emetic; symptomatic therapy as indicated.

107. PIVAL (2-Pivalyl-1; 3-Indanedione)

Remove the drug from the stomach with an emetic or with gastric lavage. Control hemorrhage by intravenous injections of vitamin K_1. Blood transfusions may be necessary.

108. PLANT POISONS (General)

Administer activated charcoal or universal antidote to remove any toxic alkaloids or glycosides; follow with gastric lavage or an emetic. Leave some activated charcoal in the stomach. Give drinks of tea or coffee; children tolerate tea better than coffee. Excitement, tremors or convulsions may be decreased by administering barbiturates orally or by injections. If there is much vomiting or purging give fluid therapy (p. 657).

109. POTASSIUM CHLORATE AND POTASSIUM BROMATE

Administer an emetic or perform gastric lavage and leave 3 to 4 heaping teaspoonfuls of Epsom salt dissolved in water in the stomach. Give copious fluids by mouth; fluid therapy may be necessary as well (p. 657). Authorities differ on the use of methylene blue to combat cyanosis. Cardiac stimulants may be required.

110. POTASSIUM NITRATE (Saltpeter, Niter)

Administer an emetic or perform gastric lavage. Keep the patient warm and in bed; an electric pad may be necessary; massage the limbs. Caffeine and sodium benzoate 0.5 gram (7½ grains) subcutaneously or intravenously may be given as a stimulant. Give mucilaginous drinks, white of egg beaten with water or olive oil.

111. POTASSIUM NITRITE (Sodium Nitrite)

Treat as for Aniline (14).

112. POTASSIUM PERMANGANATE (Condy's Crystals, Chameleon Mineral, Sodium Permanganate)

Administer activated charcoal and follow with an emetic or gastric lavage. Leave 3 to 4 heaping teaspoonfuls of Epsom salt dissolved in water in the stomach. Give milk and demulcent drinks. Fluid therapy may be necessary (p. 657).

113. PROPENE NITRILE

The symptoms may resemble those of cyanide poisoning, and treatment should be as described for cyanides (49).

114. 2(3'PYRIDYL) PIPERIDINE

The symptoms usually resemble those arising from nicotine poisoning, and treatment is as described for nicotine (89).

115. QUININE (Quinidine)

Administer universal antidote or activated charcoal and remove stomach content with gastric lavage. Keep the patient warm and in bed. Oxygen therapy (p. 657) may be required. Caffeine and sodium benzoate 0.5 gram (7½ grains) may be administered subcutaneously or intravenously. Control acidosis by intravenous sodium r-lactate solution or by sodium bicarbonate orally. Barbiturates may be injected hypodermically or intravenously if excitement occurs. In extreme cases intracardiac injection of epinephrine solution 1:1000 has been recommended.

116. SILVER (Silver Nitrate [Lunar Caustic], Silver Cyanide, Photographic Preparations, Argyrol)

Lips and mucous membranes will be brown or black. Give 3 to 4 teaspoonfuls of salt in water to form insoluble silver chloride, which can be removed with an emetic or with gastric lavage. Give demulcent drinks and morphine sulfate 8 mg. (1/8 grain) by injection as necessary to control pain;

codeine 60 mg. (1 grain) orally may suffice. Leave 4 heaping teaspoonfuls of saline purgative dissolved in ample water in the stomach. Fluid therapy (p. 657) or treatment for shock (p. 657) may be necessary.

117. SQUILL (Red or White)

Since the cardiac glycosides in squill resemble those of digitalis, see (54).

118. STRYCHNINE (Nux Vomica)

Medication must be administered *quickly*. Give universal antidote or activated charcoal in a thin paste and remove the gastric content with gastric lavage using 10 to 15 fl. ox. (300 to 450 ml.) of 1:1000 potassium permanganate solution (a 0.3 gram [5 grains] tablet dissolved in 300 ml. [10 fl. oz.] of water) or an emetic. Convulsions may be controlled quickly by ether or chloroform or nitrous oxide. Intravenous pentobarbital sodium 0.1 gram (1½ grains) or, better, Amytal (amobarbital) Sodium 0.2 gram (3 grains) should be administered and repeated as the occasion calls for it. Emetics may be used only in the first few minutes after the drug has been swallowed, as convulsions will interfere with emesis; there is also only a limited time for use of gastric lavage unless ether, etc., is given. Leave ample activated charcoal in the stomach after gastric lavage.

119. SULFONAMIDES (Sulfa Drugs)

Stop the administration of the drugs immediately. If large doses have been swallowed, give an emetic or perform gastric lavage. Force fluids orally or parenterally and alkalinize the urine by administering sodium bicarbonate orally or intravenously. Hospitalize the patient to determine blood levels of the drug and further treatment.

120. SULFUR DIOXIDE

Prompt removal of the patient from the gas is important. Oxygen therapy (p. 657) and fluid therapy (p. 657) may be required. Give drinks of tea or coffee or an injection subcutaneously or intravenously of caffeine and sodium benzoate 0.5 gram (7½ grains). Keep the patient at complete rest in bed. To relieve bronchial spasm inject 0.5 ml. 1:1000 epinephrine subcutaneously. Acidosis may be controlled by intravenous injections of sodium r-lactate or by giving sodium bicarbonate orally.

121. THALLIUM

Administer a 1 per cent sodium iodide solution and follow with drinks of milk. Remove gastric contents with an emetic or gastric lavage. Shock treatment (p. 657) may be necessary. Drinks of tea or coffee or caffeine and sodium benzoate 0.5 gram (7½ grains) intravenously or subcutaneously may be used as stimulants. Hasten the excretion of thallium by daily injections of 10 ml. of 50 per cent sodium iodide solution or 10 ml. or more of 10 per cent sodium thiosulfate solution. Frequent drinks of tea or coffee to act as a diuretic and frequent purging will also help to eliminate the thallium.

122. THEOPHYLLINE (Aminophylline, Soluphyllin)

Discontinue use of the drug. Convulsions may be controlled by suitable medication with pentobarbital sodium or Amytal (amobarbital) Sodium. For dehydration due to excessive vomiting see fluid therapy (p. 657).

123. TIN COMPOUNDS

Remove the ingested material from the stomach with an emetic or with gastric lavage. Give milk and demulcent drinks. Control nervous symptoms by suitable doses of Amytal (amobarbital) Sodium or pentobarbital sodium.

124. TITANIUM OXIDE

This pigment in paints has so far not caused any ill effects when ingested.

125. TOXAPHENE (Octachlorocamphene, Chlorinated Hydrocarbons [I])

If inhaled, recovery is usually rapid following symptomatic treatment.

If ingested, administer an emetic or empty the stomach with gastric lavage. Give a large dose of mineral oil. Control convulsions by use of intravenous or intramuscular injections of Amytal (amobarbital) Sodium or pentobarbital sodium.

Chlorinated Hydrocarbons (II)

Aldrin
Aramite
1-Bromo-2-chloroethane
Chloranil
Chlordane
Chlorobenzilate
Dieldrin
Dipterex
Endrin
Ethylene dichloride
Freon 11
Freon 12
Heptachlorocamphene
Methoxychlor
Pentachlorophenol ortho dichlorobenzene
Perthane
Rothane (DDD)
Spergon

Since these may cause poisoning by contamination as well as when ingested, see Lindane (81).

126. TRANQUILIZERS (Chlorpromazine [Largactil, Thorazine], Reserpine, Meprobamate [Miltown, Equanil])

Perform gastric lavage as quickly as possible with plenty of water. If tremors or convulsions develop, as they may do with chlorpromazine (Largactil, Thorazine) they may be controlled by barbiturates. The hypotension following reserpine and meproba-

mate (Miltown, Equanil) may be treated with ephedrine sulfate or arterenol. In the case of the latter (meprobamate) catheterization, oxygen therapy (p. 657) and fluid therapy (p. 657) may be necessary.

127. TURPENTINE (Oil of Turpentine, Spirits of Turpentine, Liniment of Turpentine, Terpene Polychlorinate, Strobane)

Administer quickly about 4 fl. oz. (120 ml.) of liquid paraffin (mineral oil, liquid petrolatum) and follow with an emetic or gastric lavage. Leave 3 to 4 heaping teaspoonfuls of Epsom salt or sodium sulfate dissolved in plenty of water in the stomach if diarrhea has not occurred. Give milk, white of egg beaten with water, gruel or barley water, with drinks of strong tea or coffee if fluids can be tolerated. Keep the patient in bed and warm. Oxygen therapy may be required (p. 657). Excitement may be controlled by 100 mg. (1½ grains) of intravenous pentobarbital sodium, and for intense pain morphine sulfate 15 mg. (¼ grain) may be injected.

128. WARFARIN

Remove the ingested material with emetic or gastric lavage as soon as possible after it has been swallowed. The patient should be kept on a milk diet and observed closely for a day or more. Vitamin K_1 should be employed to counteract bleeding tendencies; a blood transfusion may be necessary.

129. ZINC COMPOUNDS (Zinc Chloride; Zinc Sulfate [White Vitriol, White Copperas]; Zinc Undecylenate; Zinc Oxide)

For zinc arsenite and arsenate see Arsenic (18).
For zinc silicofluoride see Fluorides (63).

Administer an emetic to remove all gastric content or employ gastric lavage. Give milk or egg white beaten with water. Keep the patient in bed and warm, applying heat to the abdomen. Drinks of tea or coffee may be given. Morphine sulfate 15 mg. (¼ grain) may be injected intramuscularly to control severe pain. Give injection of BAL (p. 658). Fluid therapy (p. 657) may be necessary.

130. ZINC PHOSPHIDE (Zineb, Zinc Ethylenebisdithio-carbamate, Zinc Dimethyldithiocarbamate, Dithane)

If ingested administer an emetic or perform gastric lavage with 1:1000 potassium permanganate solution (a 0.3 gram [5 grains] tablet dissolved in 300 ml. [10 fl. oz.] of water). Clear the gastrointestinal tract with a large dose of mineral oil. The patient must be kept in bed and nursed carefully.

For skin contamination, wash the affected parts thoroughly with water.

POISONOUS SUBSTANCES IN 48 HOUSEHOLD ITEMS

(Adapted from *American Druggist*)

Should a child swallow a product the label of which does not list ingredients, a glance at the table will show what poison the product *probably* contains. Numbers in parentheses refer to appropriate paragraphs in the section on Miscellaneous Poisonings immediately preceding this table.

Polishes and Waxes for Furniture and Floors

Petroleum Distillates
Kerosene (98)
Mineral seal oil (98)
Mineral spirits (98)
Naphtha, high boiling (98)
Spindle oil
Stoddard solvent
Summer black oil

Other Toxic Substances
Antimony chloride (19)
Caustic alkali (6)
Cellosolve
Isopropyl and butyl alcohols (3)
Nitrobenzene (14)
Oxalic acid (93)
Turpentine (127)

Paint Solvents and Related Products

Paint Brush Cleaners and Preservatives
Acetone (2)
Caustic alkalis (6)
Cresols and higher phenols (100)
Dipentene (127)
Methanol (4)
Naphthalene (88)
Sodium chromate
Toluol (22)
Turpentine (127)

Paints, Putty, Varnishes
Arsenic (18)
Chromium
Iron (78)
Lead (79)
Titanium (124)
Zinc (129)

Removers of Paint, Wax, Lacquers, Grease Spots
Amyl acetate (12)
Alcohols—amyl, butyl, ethyl (2) (3) (4)
Amylene dichloride
Benzene (22)
Butyl acetate
Carbon tetrachloride (36)
Caustic alkalis (6)
Ethyl acetate
Ethylene dichloride (13) (36)
Kerosene (98)
Methyl alcohol (4)
Methylene chloride (13) (36)
Toluene (22)

RA
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Lucas, George Herbert William
Miscellaneous poisonings

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